

NAVAL WAR COLLEGE  
Newport, R.I.

## Command and Control of Multinational Naval Forces

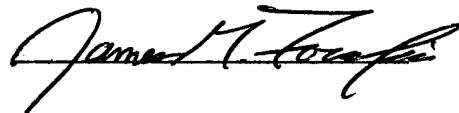
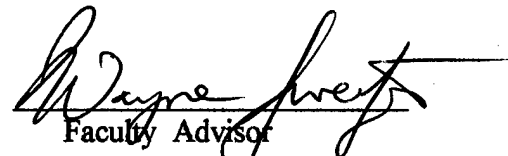
by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College of the Department of the Navy.

18 May 1998

A handwritten signature in black ink, appearing to read "James M. Fordice".A handwritten signature in black ink, appearing to read "Wayne Sweitzer".  
Faculty Advisor  
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<p><b>15. Abstract:</b> The USN is pushing towards implementation of JV-2010 in the wake of a smaller fleet and in the midst of greater emphasis upon the use of multinational forces. Implementation of the IT-21 system may bring the realization of the "system of systems" envisioned by Admiral Owens. Yet there is no guarantee that the 2010 multinational naval force commander will enjoy this envisioned level of interoperability with any units other than U.S. ships. Many U.S. allies are concerned that they are being left behind and feel they are being pushed into a peripheral role.</p> <p>A methodology is presented that addresses allied concerns that relies on mainly non-technical actions. A modified naval combat control process is presented that can be used to more clearly understand the decision process for a unit commander in a large naval force. The need to establish solid doctrine for multinational naval operations, training upon the doctrine, and conducting combined deployments and exercises to make the doctrine commonplace is stressed.</p> <p>Based upon identification of the sub-networks that make up the USN's approach to network-centric warfare and the likelihood of coalition operations between the U.S. and other navies several suggestions are made to improve the ability to form effective multinational naval forces.</p>			
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Abstract of

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The USN is pushing towards implementation of JV-2010 in the wake of a smaller fleet and in the midst of greater emphasis upon the use of multinational forces. Implementation of the IT-21 system may bring the realization of the "system of systems" envisioned by Admiral Owens. Yet there is no guarantee that the 2010 multinational naval force commander will enjoy this envisioned level of interoperability with any units other than U.S. ships. Many U.S. allies are concerned that they are being left behind and feel they are being pushed into a peripheral role.

A methodology is presented that addresses allied concerns that relies on mainly non-technical actions. A modified naval combat control process is presented that can be used to more clearly understand the decision process for a unit commander in a large naval force. The need to establish solid doctrine for multinational naval operations, training upon the doctrine, and conducting combined deployments and exercises to make the doctrine commonplace is stressed.

Based upon identification of the sub-networks that make up the USN's approach to network-centric warfare and the likelihood of coalition operations between the U.S. and other navies several suggestions are made to improve the ability to form effective multinational naval forces.

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**"We also must recognize that future problems can be solved only through multinational efforts and that the significance of international organizations is increasing. Therefore, a multinational approach will be the method of choice by which political and military requirements are met."<sup>1</sup>**

**Commander M. Cosentino, Italian Navy**

## **Introduction**

As the U.S. Navy (USN) pushes towards implementation of the capabilities called for by JV-2010 the smaller U.S. fleet and the U.S. National Military Strategy to shape the international environment is causing a greater emphasis to be placed upon multinational operations. Many countries, as evidenced by the quotation above, view multinational operations as the most effective method to achieve their political goals.

The USN is making a large investment to field the Information Technology (IT)-21 system that will bring to realization the "system of systems" envisioned by Admiral Owens. Yet there is no guarantee that the 2010 multinational naval force commander will enjoy this envisioned level of interoperability with any units other than U.S. ships. Commanders will continue to have to cope with the problem of exercising effective command and control over or coordination with forces that are unable to seamlessly integrate themselves into the U.S. Command, Control, Communication, and Computers (C4) system.

NDP 6 (Naval Command and Control) effectively articulates the naval view of Command and Control. Yet, an underlying assumption to the document is that all units will be tied together by a common C4 system, something that cannot be assumed for multinational operations. NDP 6 devotes only one paragraph to multinational operations, stating that they "represent a unique challenge to naval forces in establishing effective command and control support" and concluding

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<sup>1</sup> Commander Michele Cosentino, Italian Navy, "Multinationality: The Way Ahead for Western Maritime Power," Proceedings, March 1998, 64.

that the "key is to keep things simple."<sup>2</sup> Unfortunately, the problem is not unique and keeping things simple will only serve to reduce the missions a multinational force can accomplish.

This paper will present a methodology for addressing the multinational problem by focusing mainly on non-technical actions. By following this methodology we will be better prepared to operate in concert with minimally interoperable<sup>3</sup> multinational units.

## Models for Naval Command and Control

The simplest and best known model for command and control (C2) is the "OODA" loop developed by Col. John R. Boyd, USAF. The observe-orient-decide-act cycle is illustrated in Figure 1 (taken from NDP 6). Boyd's model is presented in NDP 6 to illustrate the decision and execution cycle of a commander. In Boyd's view the commander first *observes* the environment to determine the status of enemy and friendly forces. He then *orients* to the environment by transforming information about the environment into an understanding of the situation (he obtains "situational awareness"). He then *decides* on a course of action by formulation of a plan. Finally, he puts the plan into *action* by issuing orders.<sup>4</sup> Key to our discussion concerning multinational naval forces is the implication that there is a common tactical picture that is "shared among commanders at various levels."<sup>5</sup>

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<sup>2</sup> Department of the Navy, Naval Command and Control (Naval Doctrine Publication 6)(Washington D.C.:May 19, 1995), 43.

<sup>3</sup> JCS Pub 1-02 defines interoperability as: 1. The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together. 2. The condition achieved among communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. *The degree of interoperability should be defined when referring to specific cases.* [Emphasis added]

<sup>4</sup> Department of the Navy, Naval Command and Control (Naval Doctrine Publication 6)(Washington D.C.:May 19, 1995), 18.

<sup>5</sup> Ibid., 19.

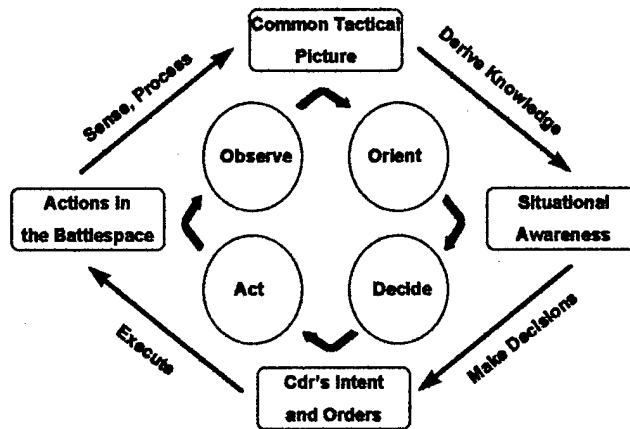


Fig 1. The Decision and Execution Cycle (NDP 6)

Boyd's model, while accurately depicting the process used by a fighter pilot in a dogfight, has been criticized by Maj. George E. Orr, *Combat Operations C3I: Fundamentals and Interactions* as needing "substantial expansion and clarification in order to provide an acceptable combat operations process model."<sup>6</sup>

More suitable in Orr's view is the model developed by Joel S. Lawson as illustrated in Figure 2. Lawson views that the purpose of the command and control process is "to either maintain or change the equilibrium state of the environment, as determined by higher authority."<sup>7</sup> Lawson's model provides a clearer sense of the relationship between the various levels of a larger naval force. The *sense* function is all the data gathering activities directly available to a command. The *process* function turns the raw data into information. External data, provided and processed by external sources enters at this point. The *compare* function consists of comparing the information obtained from processing with the desired state. In the *decide* function the

<sup>6</sup> Kenneth Allard, *Command, Control, and the Common Defense* (Yale University Press 1996), 155.

<sup>7</sup> Joel S. Lawson, "Naval Tactical C<sup>3</sup> Architecture 1985-1995," *Signal*, August 1979, 72.

commander determines what should be done to cause the environment to move towards the desired state. In the *act* function the decision is acted upon.<sup>8</sup>

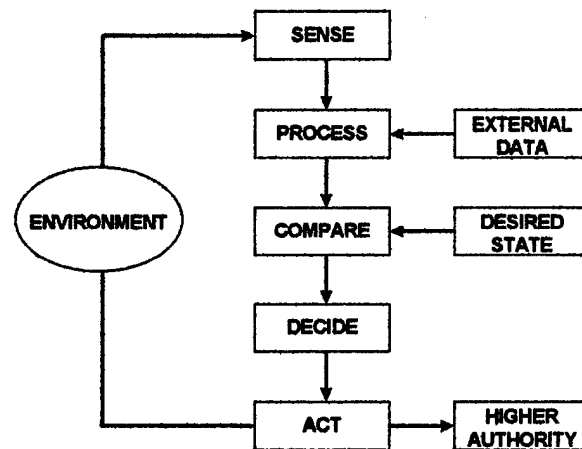


Fig 2. Lawson Model

The Lawson model is more useful for helping us to understand the naval combat operations process because it includes the effect of external organizations. By using it we can more clearly understand how it is possible to integrate forces that do not enjoy a common tactical picture. There is a ready example within the USN of how to deal with the lack of a common tactical picture: the submarine force.

## Submarine Command and Control

A submarine is inherently limited in its ability to transmit because of the need to remain undetected. Since the end of the cold war U.S. SSNs have been integrated into carrier battlegroups and have been outfitted with additional communication equipment to support the increased two-way communications such operations currently demand. Yet, our submarines still perform independent operations that cause them to maintain communication silence for periods exceeding a month. The operations being performed during these periods are complex and

<sup>8</sup> George R. Orr, Combat Operations C<sup>3</sup>I: Fundamentals and Interactions (Maxwell AFB, AL: Air University Press

involve the support of several external organizations that provide the submarine with information that cannot be obtained by the submarine's organic sensors. According to RADM Jerry Holland, USN(Ret.) the C2 structure used during independent operations is based on the following tenets:

- Long range planning
- Independent action
- A well developed sense of operational methods
- Minimum communications - mostly one way

In order to successfully conduct such operations the submarine force commanders must be "accustomed to planning well ahead," be backed up by "well trained, highly-motivated subordinates," and possess a "common culture or doctrine."<sup>9</sup>

Figure 3, a modification of the Lawson model made for the purpose of this paper, depicts the submarine C4 system. The submarine is aided in its mission by external organizations that send it intelligence about the disposition of enemy forces that cannot be detected directly by the submarine. The external commander does not direct the submarine to take specific actions, except in extraordinary circumstances, because the external commander does not know where the submarine is located and is not in possession of the information available to the submarine commander from his organic sensors. Only the submarine commander possesses the complete picture upon which to make tactical decisions. Because the external organizations understand what the submarine is attempting to accomplish they are able to provide the submarine with knowledge that is tailored to the mission, thereby reducing the volume of traffic that needs to be sent to the submarine.

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1983), 25.

<sup>9</sup> RADM Jerry Holland, USN(Ret.), "Tactics and Training: Keys to Command and Control and Solutions to Radio Communications Restrictions," The Submarine Review, January 1998, 6.



Along the same lines as the submarine force VADM James B. Stockdale's experiences in setting up a communication system while a prisoner of war illustrate that successful communications rely on making things short, sending essential data only, and keeping the volume down (remain undetected).<sup>10</sup>

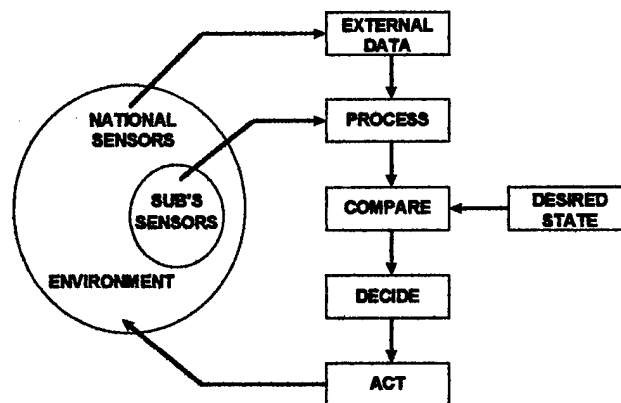


Fig 3. Modified Lawson Model

## Doctrine

Joint doctrine provides several good clues on how to proceed. The Multinational Maritime Operations (MMOPS) document, which serves as the capstone for the EXTAC 1000 series of Multinational Maritime Manuals, identifies three types of C2 schemes for multinational operations: parallel, lead nation, and integrated.<sup>11</sup> In the parallel and lead nation schemes each nation's assets work in support of the actions of other nations using their own C4 systems. The integrated scheme envisions one C4 system that links all forces under a single commander. However, JCS Pub 3-0 (Doctrine for Joint Operations) implies that it is not likely that an integrated scheme will be adopted, especially for a coalition. Most nations will elect to retain control of their armed forces. Even when a combined commander is appointed who theoretically

<sup>10</sup> VADM James B. Stockdale, USN(Ret.), "Communicating Without Technology," *Signal*, October 1979, 26-32.

<sup>11</sup> Naval Doctrine Command, *Multinational Maritime Operations* (MMOPS) (Norfolk, VA: September 1996), 3-6.

exercises command of all multinational forces, Pub 3-0 recognizes that individual nations will retain strategic control of their forces as was done during Operation Desert Storm.<sup>12</sup> Thus, the naval multinational commander will need to establish a C4 system that links him to the principal ships of each nation and must rely upon those ships to use national systems to provide command and control of their individual units.

JCS Pub 3-0 provides guidance that "actions to improve interoperability and the ability to share information need to be addressed early (*as early as the development of military systems for formal alliances*)." (emphasis added) Joint and multi-national exercises are identified as key components towards refinement of joint training and doctrine.<sup>13</sup>

JCS Pub 6-0 (Doctrine for Command, Control, Communications, and Computer (C4) Systems Support for Joint Operations) identifies the objectives of a C4 system to be (1) produce unity of effort, (2) exploit total force capabilities, (3) *properly position critical information*, and (4) information fusion.<sup>14</sup>

### **Where Are We Heading?**

According to Admiral William D. Smith, USN (Ret.): "Many senior allied officers are concerned not only that the United States already is too far ahead for them ever to catch up, but also that our lead is increasing daily." He believes this is causing many nations to tacitly accept a peripheral role. He considers acceptance of a peripheral role to be critical because "without a

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<sup>12</sup> Joint Chiefs of Staff, Doctrine for Joint Operations (Joint Publication 3-0)(Washington D.C.:February 1, 1995), Fig VI-2, p. VI-7.

<sup>13</sup> Ibid., VI-3.

<sup>14</sup> Joint Chiefs of Staff, Doctrine for Command, Control, Communications, and Computer (C4) Systems Support to Joint Operations (Joint Publication 6-0)(Washington D.C.:May 30, 1995), I-5.

common tactical picture, there is little evidence that even our closest allies will be willing to share the risk of a high-intensity conflict . . . and could feel that they are merely expendable targets.”<sup>15</sup>

Professor Frank Snyder of the U.S. Naval War College expresses his concern as: “One of the unfortunate effects of increasingly capable C4 systems has been to encourage commanders to feel there is less need either for flexible orders or for the intensive planning that produce them. Thus, modern C4 systems, instead of enhancing the classic military planning process, seem to have become a substitute for it.”<sup>16</sup>

An example of the trend Professor Snyder is concerned about occurred during the Taiwan Crisis of 1995 when the U.S. Seventh Fleet Commander, VADM Clemins, utilized PC-based Video Teleconferencing and E-Mail to cut the time needed to plan the operation. The approach was a great success and has propelled the USN to accelerate the acquisition of the technology (IT-21). But this is an example of what can be done with similarly outfitted U.S. ships. If the operation had been a multinational one, in which key foreign players could not have participated, the lesson learned may have been quite different.

The real issue is whether the U.S. is leaving its friends behind. Professor Snyder views the options as being a choice between two extremes. One extreme is to stop advancing U.S. systems and the other is to ignore the problem.<sup>17</sup> The first option is certainly not a good idea. In reality the USN is currently at the second extreme; there is great hope that systems such as IT-21 will solve the problem by itself and all that needs to be done is to provide the equipment need for interoperability once a multinational force is formed.

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<sup>15</sup> William D. Smith, “Interoperability: More Important Than Ever,” Proceedings, April 1998, 2.

<sup>16</sup> Frank M. Snyder, Command and Control: The Literature and Commentaries (Washington D.C.:National Defense University 1993), 61.

<sup>17</sup> Frank M. Snyder, Professor Emeritus Naval War College, telephone conversation with author, April 7, 1998.

### ***Where is connectivity needed?***

As I have already identified, the multinational commander will normally need a C4 system between the principal/command ships of his force and will need to rely upon national systems at lower levels. The first question is to estimate the number of ships that need the capability to link for multinational operations (i.e., how many navies with how many principal/command ships are potential multinational participants)? Jane's Fighting Ships lists 161 "navies" in the table of contents. The navies can be placed in four categories based on the likelihood that they will participate in multinational operations with the United States: unlikely, potential, certain, and Coast Guard-like.

In the "unlikely" category are those countries that are not candidates for political reasons (e.g. North Korea, Cuba, Iran), because of their size (e.g. Panama, Virgin Islands, Haiti), because they are strictly a river or lake patrol force (e.g. Austria, Bolivia, Hungary), or because the United States has no vital national interests in the area (most African navies). In the "potential" category are those countries that possess a substantial navy with capabilities that would add to a multinational effort with which the United States has a low probability of a wartime coalition but may need to integrate for military operations other than war (MOOTW) (e.g. Argentina, India, Russia). In the "certain" category are those countries that possess large navies with which the United States has significant operational experience, an alliance partnership, and a high probability of alliance/coalition operations in both war and MOOTW (e.g. Australia, Japan, United Kingdom).

The last category is Coast Guard-like navies. Many navies have missions that are more like the U.S. Coast Guard (USCG) than the USN. The USCG maintains close relations with

many navies including Mexico, Columbia, and Iceland.<sup>18</sup> I have counted those Coast Guard-like navies that are located in areas of the world where the United States has strategic interests in a fourth category. Table 1 shows the numbers in each category.

<u>Category</u>	<u>Number</u>
Unlikely	106
Potential	21
Certain	7
Coast Guard	27

Table 1 - Categories of Interoperability Likelihood.

Based on this analysis the number of principal ships with which a significant interoperability is required in order to support potential wartime multinational naval operations is less than twenty. In this category are the French carrier Charles De Gualle, the Italian carrier Garibaldi, the Japanese Kongo class destroyers, the Spanish carrier Principe De Arturias, and the United Kingdom's Invincible class carriers.

Separately, there are 28 countries that possess a significant submarine force. Of these eleven are countries with which the USN already has substantial operational experience.

Thus, there is a rather small number of countries with which the USN needs to be able to establish a substantial level of interoperability.

The second question is to determine what degree of interoperability is needed. The USN network-centric warfare design is based on three sub-networks as shown in Table 2.<sup>19</sup>

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<sup>18</sup> Naval War College Operations Department Publication, The U.S. Coast Guard: A Unique National Security Instrument, June 1993.

<sup>19</sup> VADM Arthur K. Cebrowski and John J. Garska, "Network-Centric Warfare: Its Origin and Future," Proceedings, January 1998, 33.

<u>Name</u>	<u>System</u>	<u>Function</u>	<u>Number of Users</u>
Composite Tracking Network	CEC	Weapons Control	<24
Data Network	Link 16/11	Force Control	<500
Planning Network	IT-21	Force Coordination	~1000

Table 2 - U.S. Network-Centric Design.

Cooperative Engagement Capability (CEC) is being installed on carriers and Aegis cruisers and destroyers. This system is intended primarily for Anti-Air Warfare (AAW) and Theater Missile Defense (TMD). It is highly weapon and sensor specific, making it very difficult to install on non-U.S. ships.

Link 11 can be found on virtually all U.S. ships and most NATO or close U.S. ally ships. The Department of the Navy expects to have 75% of USN and major allied ships outfitted with the newer Link 16 system or other replacements by 2005.<sup>20</sup>

IT-21 is starting to be installed on most U.S. surface ships and should be installed on all by 2002.<sup>21</sup> It is a Secret-level navy wide web similar to the INTERNET that will link many of the currently stovepiped information systems and allow them to be accessed from one location. It will foster horizontal sharing of information with an emphasis on users pulling data instead of having it pushed to them. If the TELEDESIC system, a constellation of 288 low-Earth-orbit satellites, is successful it will allow anyone with the appropriate cryptologic system and an approximately \$5000 antenna system and receiver to tie into the IT-21 system.<sup>22</sup> Since the entire

<sup>20</sup> LCDR Terry Mosher, "US Navy Tactical Data Link Plan," Briefing slides, Chief of Naval Operations (N62G1): Aug 1997.

<sup>21</sup> CDR Jay Chesky, Department of the Navy (OPNAV) N-6, telephone conversation, March 26, 1998.

<sup>22</sup> "Teledesic Fast Facts." Teledesic LLC. <<http://www.teledesic.com/overview/fastfact.html>> (3 May 1998).

system is based on the PC standard commonality, as defined in JCS Pub 1-02, will be substantially achieved.

If IT-21 is successfully implemented there will be little compartmentation or limitations to access. This will be a great boon to interoperability between USN ships but will also pose the most difficulty in allowing foreign ships to access the system.

As it should be clear, most certain or potential coalition partners will not possess the level of interoperability that will exist between U.S. ships in 2010. Few, if any, foreign ships will be able to participate in CEC, making their participation in high tempo operations that require AAW and/or TMD difficult at best.

## **Methodology**

To successfully engage in multinational naval operations with units that vary in their interoperability the USN must establish an appropriate doctrine, an ability to produce detailed plans that implement the doctrine, and practice the application of the doctrine as often as possible. The USN must also keep in mind that most of the foreseeable multinational operations will be MOOTW, which, due to the slower pace of operation, do not demand as high a level of interoperability as war.

The more successful IT-21 is at breaking down the barriers between the stovepiped systems and eliminating compartmentation and limited access for U.S. users the more difficult it will be to allow access for foreign users. The most straightforward way to address this difficulty will be to limit foreign access to the equivalent of an INTERNET homepage (which I refer to as a "gateway") that is designed specifically for the individual country. In this way language problems and access can be addressed and critical information can be properly positioned. The foreign user

could send e-mail requests to pull information from U.S. sources and could participate in video teleconferencing through the TELEDESIC link. Figure 4 illustrates the combat control process for a multinational unit with an IT-21 gateway.

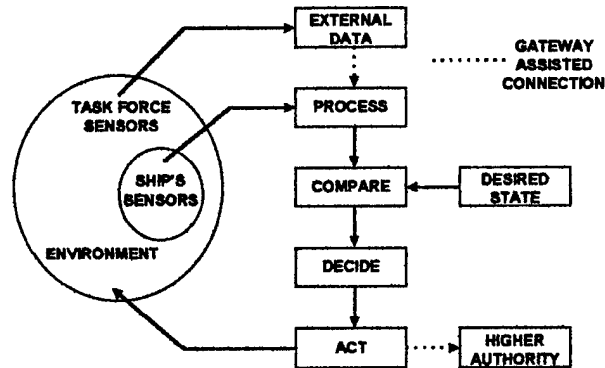


Fig 4. Lawson Model for Multinational Unit

I propose a broad two level approach based on whether a nation is a certain or probable coalition candidate. The goal for the certain coalition partners should be complete integration in the U.S. network-centric system, with emphasis on fully equipping principal/command ships as soon as possible. If necessary, the United States should provide the equipment needed to obtain full integration. The probable coalition partners should be encouraged to acquire a minimum capability of Link 11/16 and IT-21. CINCs should determine which countries will receive emphasis through permanent gateway support with the rest receiving support as needed.

NDP 6 should be revised to present a more representative model for naval combat operations similar to Figures 3 and 4. The "OODA" loop is a catchier phase but the modified Lawson model presents a clearer picture of how a naval commander should view where his ship fits in the larger picture, especially when his unit does not enjoy access to a full common tactical picture.

The USN needs to determine what capabilities a multinational naval force should be expected to carry out during war and MOOTW. The Naval Doctrine Command is already well



into a multinational effort to develop MOOTW doctrine for multinational operations through the Multinational Maritime Doctrine Project.<sup>23</sup> The purpose of the project is to create credible maritime doctrine and procedures. Commendably, the USN is maintaining editorial control, thus avoiding a lengthy ratification process. The USN should put full effort into training its forces to use the new publications and to put the doctrine through its paces through vigorous exercises.

The USN must seek security classification and information sensitivity policy changes that will remove most of the hindrances to full IT-21 access for at least our closest allies. Given that IT-21 is a secret level system the most sensitive information is already excluded.

Exercises should be conducted to determine the capabilities of a multinational force. Focus should be placed on establishing what tasks should only be accomplished by fully integrated ships and how to provide force protection for a less than fully interoperable multinational force.

Since the Universal Navy Task List (a listing of the tasks the USN is able to accomplish in support of Joint operations) is unclassified (and downloadable from the INTERNET) all certain and potential coalition partners should be encouraged to establish a Minimum Essential Task List (METL) for their ships that is based on multinational doctrine. By sharing the METLs between navies a better understanding will be gained of the capabilities that each platform offers, which should speed operational planning.

The most important contribution of the IT-21 system will be horizontal information sharing. Anyone with access to the network will be able to access almost any information on it. This change will necessitate a new way of looking at how a ship or staff is organized. As the USN makes this fundamental change it should keep its close allies up to speed on the lessons learned.

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<sup>23</sup> "Charter for the Multinational Maritime Doctrine Project." Naval Doctrine Command.

CINCs should establish as part of their Deployable Joint Task Force Augmentation Cell (DJTFAC) (or the equivalent) a cell of operators that possess the language, cultural, and gateway expertise to work with all anticipated coalition partners. The cell would collect, process, and disseminate intelligence and other support information through the gateway. Video conferencing through the gateway, aided by DJTFAC interpreters, will greatly improve the ability of the multinational commander to coordinate the efforts of the multinational force.

An unclassified publication that establishes standard operating procedures for a gateway should be published.

The USCG already works closely with many of the Coast Guard-like navies. Thus, we already have in-place the ability to work with those navies. In any circumstance where U.S. forces need to operate with a Coast Guard-like navy the USCG should take the lead.

The recent training of the latest Japanese Kongo class destroyer at the Pacific Missile Range Facility (PMRF) at Kauai, Hawaii<sup>24</sup> is an excellent example of the utility of a common training area for multinational forces. The USN should vigorously pursue the use of PMRF and other facilities as global naval training sites.

The Kongo class is also an example of a foreign ship that can be readily integrated into a U.S. battlegroup because of the commonality of its systems with U.S. ships. Where possible the USN should strongly encourage other navies to build their ships, especially principal ones, with a view towards multinational integration. The United States should also be mindful to avoid upgrading its ships while leaving allies behind unless the gain is clearly worth the decrease in multinational operability.

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<[http://ndcweb.navy.mil/htsdocs/2\\_CHART.HTm](http://ndcweb.navy.mil/htsdocs/2_CHART.HTm)> (May 4, 1998).

<sup>24</sup> LCDR Vance A. Brashosky, USN, "Japan's Third Aegis Destroyer Sees Many Firsts." Proceedings, March 1998, 61.

Submarines, especially diesel types, operate independently. The USN already has arrangements with many allied nations for waterspace management and other issues. The USN should continue to build on this foundation by establishing a common doctrine for submarine operations as part of the Multinational Maritime Doctrine effort.

It is time for the USN to make regular deployments with multinational forces. For example, when a nation such as the United Kingdom, France, or Australia is planning to send ships to the Arabian Gulf we should offer to integrate them into a U.S. CVBG throughout the workup and deployment. Pearl Harbor based ships regularly deploy with battlegroups homeported at San Diego and Yokosuka; it should not be too difficult to bridge the same distances with allies.

### **Conclusion**

As the perceived need for multinational operations increases the United States and its major allies must balance the tension between the desire for coalitions and the ability to rapidly generate interoperable forces. A common tactical picture is not needed on all ships as long as there is sufficient interoperability to push and/or pull the critical information to all units. By successfully concentrating on establishing solid doctrine, training on the doctrine at every opportunity, searching for non-technical ways to fully utilize existing systems, and making multinational operations commonplace through combined deployments and frequent exercises the fear identified by Admiral Smith will be alleviated and the experienced leaders and cultural commonality needed for minimally interoperable operations will be obtained.

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